

Claims

*Sub B'*

1. A substantially pure nucleic acid encoding a SynMuv polypeptide selected from the group consisting of LIN-37, LIN-35, LIN-55, LIN-53, LIN-52, LIN-54, and E2F-1.

5            2. The nucleic acid of claim 1, wherein said nucleic acid comprises nucleic acid encoding LIN-54.

3. The nucleic acid of claim 1, wherein said nucleic acid encodes LIN-37, LIN-52 or LIN-54.

4. The nucleic acid of claim 1, wherein said nucleic acid is cDNA.

10           5. The nucleic acid of claim 1, wherein said nucleic acid is *C.elegans* DNA.

6. The nucleic acid of claim 1, wherein said nucleic acid is human DNA.

*Sub B2*

15           7. A substantially pure DNA encoding an amino acid sequence selected from the group consisting of SEQ ID NOS:1, 3, 5, 7, 9, 11, and 13.

8. A substantially pure DNA having the sequence of SEQ ID NO:15, or degenerate variants thereof.

9. A substantially pure DNA having the sequence of SEQ ID NO:16, or degenerate variants thereof. *B*

*Sub B3* 10. A substantially pure nucleic acid comprising nucleic acid having about 50% or greater nucleotide sequence identity to the DNA sequence of selected from the group consisting of SEQ ID NOS:2, 4, 6, 8, 10, 12, 14, 15, and 16.

11. The nucleic acid of claim 1, wherein said DNA is operably linked to regulatory sequences for expression of said polypeptide and wherein said regulatory sequences comprise a promoter.

12. The nucleic acid of claim 11, wherein said promoter is a constitutive promoter.

13. The nucleic acid of claim 11, wherein said promoter is inducible by one or more external agents.

14. The nucleic acid of claim 11, wherein said promoter is cell-type specific.

15. A vector comprising the nucleic acid of claim 1, said vector being capable of directing expression of the peptide encoded by said DNA in a vector-containing cell.

16. A cell which contains the nucleic acid encoding a SynMuv polypeptide selected from the group consisting of LIN-37, LIN-35, LIN-55, LIN-53, LIN-52, LIN-54, and E2F-1.

17. The cell of claim 16, said cell being present in a patient having a cell proliferation disease.

18. A transgenic cell which contains the nucleic acid encoding a SynMuv polypeptide selected from the group consisting of LIN-37, LIN-35, LIN-55, LIN-53, LIN-52, LIN-54, and E2F-1.

19. A substantially pure mammalian SynMuv polypeptide.

20. The polypeptide of claim 19, wherein said polypeptide is LIN-54 polypeptide.

21. A therapeutic composition comprising as an active ingredient a SynMuv polypeptide, said SynMuv polypeptide being formulated in a physiologically acceptable carrier.

22. A method of modulating cell proliferation of a cell, said method comprising administering to said cell a proliferation modulating amount of SynMuv polypeptide.

23. The method of claim 22, wherein said cell is in a mammal.

24. The method of claim 23 wherein said mammal is a human.

Sub 25. A SynMuv gene isolated according to the method comprising:

- B6 (a) providing a cell sample;  
(b) introducing by transformation into said cell sample a candidate

5 SynMuv gene;

- (c) expressing said candidate SynMuv gene within said cell sample; and  
(d) determining whether said cell sample exhibits an altered cell

proliferation response, whereby an altered level of cell proliferation identifies a SynMuv gene.

10 26. A purified antibody which binds specifically to a SynMuv family protein.

27. A method of identifying a compound which modulates cell proliferation, said method comprising (a) providing a cell expressing a SynMuv polypeptide; and (b) contracting said cell with a candidate compound and  
15 monitoring the expression of a SynMuv gene, an alteration in the level of expression of said gene indicating the presence of a compound which modulates cell proliferation.

28. A method of diagnosing an animal for the presence of an cell proliferation disease or an increased likelihood of developing a cell proliferation  
20 disease, said method comprising isolating a sample of nucleic acid from said animal and determining whether said nucleic acid comprises a mutated SynMuv

gene, a mutation in said nucleic acid being an indication that said animal has an cell proliferation disease or an increased likelihood of developing a cell proliferation disease.

5 29. A method of diagnosing an animal for the presence of a cell proliferation disease or an increased likelihood of developing a cell proliferation disease, said method comprising measuring SynMuv gene expression in a sample from said animal, an alteration in said expression relative to a sample from an unaffected animal being an indication that said animal has a cell proliferation disease or increased likelihood of developing a cell proliferation disease.

10 30. The method of claim 28 or 29, wherein said SynMuv gene is *lin-54*.

31. The method of claim 28 or 29, wherein said gene expression is measured by assaying the amount of SynMuv polypeptide in said sample.

32. The method of claim 31, wherein said SynMuv polypeptide is measured by immunological methods.

15 33. The method of claim 29, wherein said SynMuv gene expression is measured by assaying the amount of SynMuv RNA in said sample.